



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,706	10/23/2003	Theodore J. Copperthite	M-15261 US	9787
32605 7590 07/31/2007 MACPHERSON KWOK CHEN & HEID LLP 2033 GATEWAY PLACE SUITE 400 SAN JOSE, CA 95110			EXAMINER KERN, KEVIN P	
			ART UNIT 1725	PAPER NUMBER
			MAIL DATE 07/31/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.		Applicant(s)	
	10/692,706		COPPERTHITE ET AL.	
	Examiner		Art Unit	
	Kevin P. Kerns		1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,7 and 11-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,7 and 11-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to because a portion of the structural features within Figures 3, 4, 8, and 9 are difficult to distinguish due to a dark, photocopied appearance. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 1725

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 18, 19, 22, and 25-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Bechard et al. (US 4,028,798).

Bechard et al. disclose a method of making electrical connections (attaching a wire/filament comprising a conductive material of copper or aluminum to a bonding area) to circuitry components such as printed circuit boards, in which the method includes providing a bond tool/head (in the form of pressurizing anvil 72 and/or ultrasonic vibrating wire embedding tool 73 applied perpendicular to the bonding area – column 6, lines 34-68; column 7, lines 1-15; and Figures 5-10); forming a groove (defined by the circumference of the wire/filament upon final positioning) in the bonding area via embedding the wire into plastic that is deformed upon heating (with a single pass) by the anvil 72 and/or ultrasonic tool 73, thus placing the wire in the groove and enclosing the groove upon final positioning of the wire (abstract; column 1, lines 56-68; column 2, lines 1-59; column 6, lines 11-68; column 7, lines 1-68; column 8, lines 1-13; and Figures 5-10).

4. Claims 15-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Deubzer et al. (US 4,781,319).

Deubzer et al. disclose a bonding head that includes two clamping portions between the bonding head and a rotatable spool that contains wire, in which the bonding head assembly 10 includes a bonding tool 18 connected to an ultrasonic

Art Unit: 1725

transducer 16, in which the bonding tool 18 includes a groove portion 84; a wire spool 22 containing wire 20 thereon (Figures 7 and 8); a dancer arm assembly 34 comprising an arm and a pulley at the end of the arm (see Figure 6), such that the wire is laid out from the spool and along the pulley within the groove of the pulley for smoother wire guidance therein, and one of the clamping portions (as discussed in the portions that follow) is located between the pulley and the bonding tool 18; a first clamping portion (adjustable guide 56 with adjustment means 58 in Figure 1) that applies a clamping force on wire 20, such that the first clamping portion includes a first (fixed) clamp arm having curved first and second portions (defining the wire aperture), with the first portion (on the left side of Figure 1) being closer to the wire spool 22 than the second portion (on the right side of Figure 1); and a second clamping portion in the form of an opposing (in terms of applying a second clamping force of wire 20) and moveable second clamp arm (wire clamp 24) having curved first and second portions (exterior tapered surfaces adjacent jaws 26 of wire clamp 24 with one portion being closer to the wire spool 22 than the other portion – column 4, lines 48-58; and Figure 1), such that the opening formed in adjustable guide 56 is wider than the gripping region at its narrowest portion (abstract; column 1, lines 48-68; column 2, lines 1-56; column 3, lines 28-68; column 4, lines 1-58; column 5, lines 22-68; column 6, lines 1-40; and Figures 1 and 6-8).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1725

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 20, 21, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bechard et al. (US 4,028,798) in view of Elwood et al. (US 5,217,154).

Bechard et al. disclose the features of claims 18 and 19 in above section 3. Bechard et al. do not specifically disclose that the pressing portion of the bonding tool/head includes either a grooving portion or a staking portion with an inverted V shape.

However, Elwood et al. disclose a semiconductor bonding tool that is operable for transmitting ultrasonic energy, in which the bonding tool 1 includes an aperture 9 (serving as a guide portion) that further includes aperture opening 11 and aperture outlet 13, and either a semicircular or inverted V-shaped groove 7 (operable as either a

Art Unit: 1725

grooving portion or a staking portion, respectively) at the tip of the bonding tool for retaining a wire/ribbon 15 to be welded therein (abstract; column 1, lines 9-14; column 2, lines 36-68; column 3, lines 12-46; column 4, lines 1-2; and Figures 1 and 2).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the method of making electrical connections that includes providing a bond tool/head, as disclosed by Bechard et al., by using the pressing portion of the bonding tool/head that includes a grooving portion or a staking portion with an inverted V shape, as taught by Elwood et al., in order to retain a wire/ribbon to be welded therein (Elwood et al.; column 3, lines 14-18).

8. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elwood et al. (US 5,217,154) in view of Benson et al. (US 3,747,198).

Elwood et al. disclose a semiconductor bonding tool that is operable for transmitting ultrasonic energy, in which the bonding tool 1 includes an aperture 9 (serving as a guide portion) that further includes aperture opening 11 and aperture outlet 13, and either a semicircular or inverted V-shaped groove 7 (operable as either a grooving portion or a staking portion, respectively) at the tip of the bonding tool for retaining a wire/ribbon 15 to be welded therein (abstract; column 1, lines 9-14; column 2, lines 36-68; column 3, lines 12-46; column 4, lines 1-2; and Figures 1 and 2). Elwood et al. do not disclose the use of both a grooving section and a staking section.

However, Benson et al. disclose a bond tool/head for use in wedge bonding of gold wire to cermet substrates, in which the bond tool/head (bonding wedge 30)

Art Unit: 1725

includes a working tip 32 defined by two tapered end sections that include a shallow elongated groove 34 (operable as a grooving section) operable to form a groove in the bond upon lowering of the bonding wedge 30, and wire guide means 42 (operable as a staking section) to facilitate seating of the wire 38 in groove 34, such that the use of both a grooving section and a staking section is advantageous for obtaining reliably strong bonds due to elongated contact area of the wire with the cermet substrate during bonding (abstract; column 1, lines 5-9; column 2, lines 52-68; column 3, lines 14-68; column 4, lines 1-39; and Figure).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the semiconductor bonding tool that is operable for transmitting ultrasonic energy, as disclosed by Elwood et al., by using the bond tool/head that has both a grooving section and a staking section, as taught by Benson et al., in order to facilitate seating of the wire in the groove, thus obtaining reliably strong bonds due to elongated contact area of the wire with the cermet substrate during bonding (Benson et al.; abstract; column 2, lines 52-58; and column 3, lines 29-52).

9. Claims 7 and 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deubzer et al. (US 4,781,319) in view of Benson et al. (US 3,747,198).

Deubzer et al. disclose the features of above section 4. Deubzer et al. do not disclose the use of both a grooving section and a staking section.

However, Benson et al. disclose a bond tool/head for use in wedge bonding of gold wire to cermet substrates, in which the bond tool/head (bonding wedge 30) includes a working tip 32 defined by two tapered end sections that include a shallow elongated groove 34 (operable as a grooving section) operable to form a groove in the bond upon lowering of the bonding wedge 30, and wire guide means 42 (operable as a staking section) to facilitate seating of the wire 38 in groove 34, such that the use of both a grooving section and a staking section is advantageous for obtaining reliably strong bonds due to elongated contact area of the wire with the cermet substrate during bonding (abstract; column 1, lines 5-9; column 2, lines 52-68; column 3, lines 14-68; column 4, lines 1-39; and Figure).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the bonding head that includes two clamping portions between the bonding head and a rotatable spool that contains wire, as disclosed by Deubzer et al., by using the bond tool/head that has both a grooving section and a staking section, as taught by Benson et al., in order to facilitate seating of the wire in the groove, thus obtaining reliably strong bonds due to elongated contact area of the wire with the cermet substrate during bonding (Benson et al.; abstract; column 2, lines 52-58; and column 3, lines 29-52).

Response to Arguments

10. The examiner acknowledges the applicants' amendment received by the USPTO on September 18, 2006. The applicants have cancelled 4-6 and 9, thus overcoming all

Art Unit: 1725

prior claim objections and 35 USC 112 rejections. It is noted that no rejections based upon prior art were set forth in the Office Action dated July 25, 2006. However, upon further review and search, new drawing objections and prior art rejections under 35 USC 102(b) and 35 USC 103(a) are now presented in above sections 3, 4, and 7-9, and thus the previous allowable subject matter has been withdrawn. Claims 1, 3, 7, and 11-27 are currently under consideration in the application.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 5,387,305 and US 5,894,981 are also cited in PTO-892.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571) 272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jonathan Johnson can be reached on (571) 272-1177. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1725

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin P. Kerns *Kevin Kerns* 7/23/07
Primary Examiner
Art Unit 1725

KPK

kpk

July 23, 2007